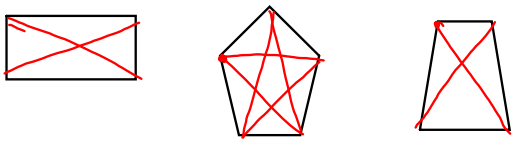
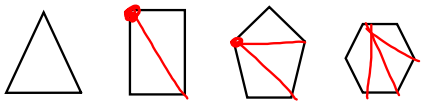
Chapter 8 Quadrilaterals

8-1 Angles of a Polygon

diagonal--segment that connects nonconsecutive vertices





sides	3	4	5	6	n
# of △s	1	2	3	4	(n-2)
degrees	180°	360°	540°	720°	(n-2)180

Theorem 8.1 Interior Angle Sum Theorem
In a convex polygon with n sides, the sum of the interior angles is (n-2)180.

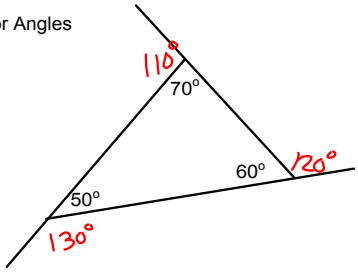
Quick Ex:

n = 20

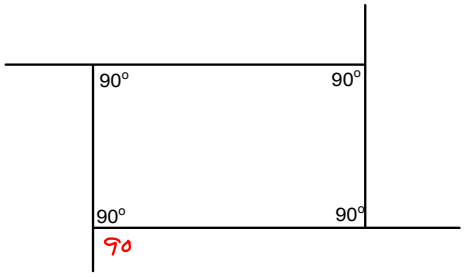
(20-2)·180

= 3240°

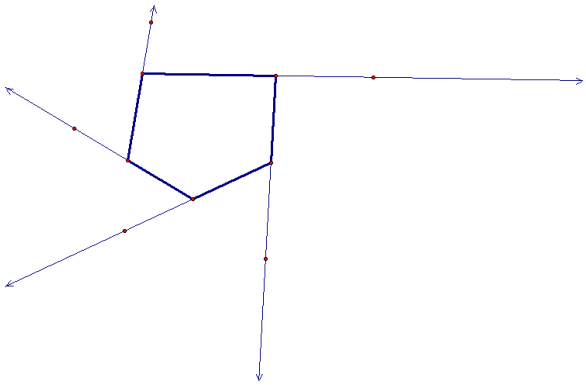
Exterior Angles

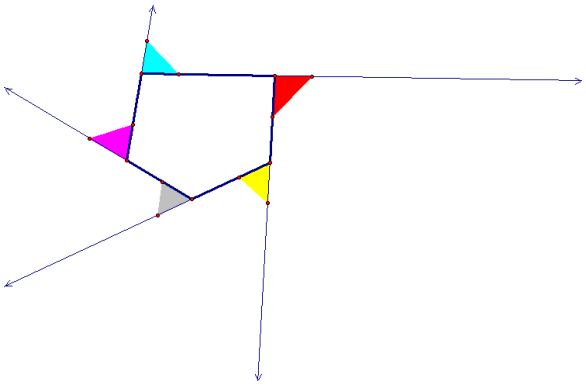


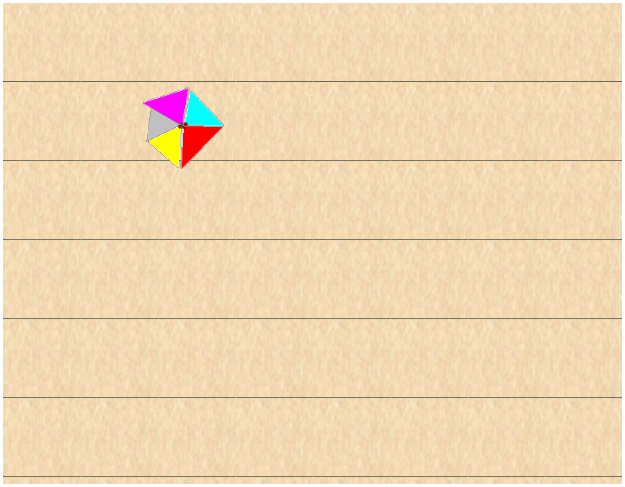
110
120
+130
360°

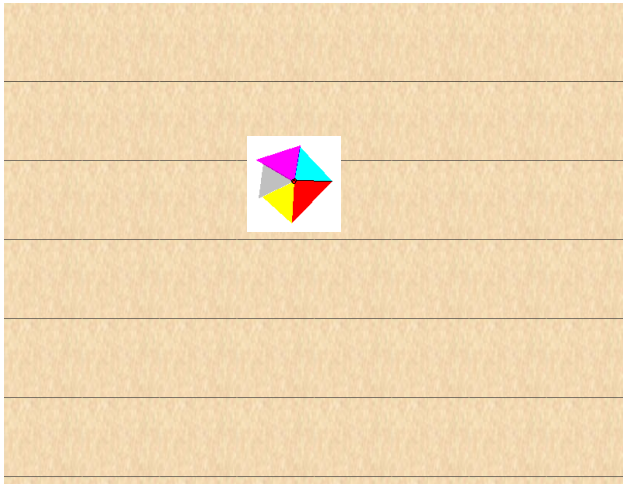


90
x 4
360°



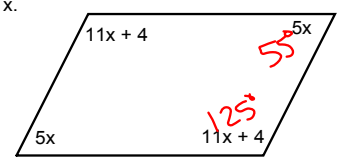






Theorem 8.2 Exterior Angle Sum Theorem--
In a convex polygon, the sum of the measures of the exterior angles, one at each vertex, is 360°.

Solve for x.



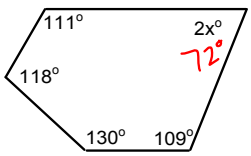
$(n-2)180$

# of sides

$2(5x) + 2(11x+4) = 360$

$x = 11$

Solve for x.

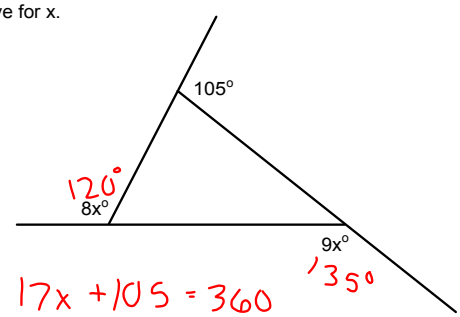


$(5-2)180$

$2x + 111 + 118 + 130 + 109 = 540$

$x = 36$

Solve for x.



$17x + 105 = 360$

$x = 15$

Regular Polygon--Both equilateral and equiangular

n	6
interior angle sum $(n-2)180$	$(6-2)180$ $720°$
exterior angle sum $=360°$	$360°$
Regular each interior angle	$720 \div 6$ $120°$
each exterior angle (suppl.)	$360 \div 6$ $60°$

n	10
interior angle sum	$(10-2)180$ 1440°
exterior angle sum	360°
Regular each interior angle	144°
each exterior angle	36°

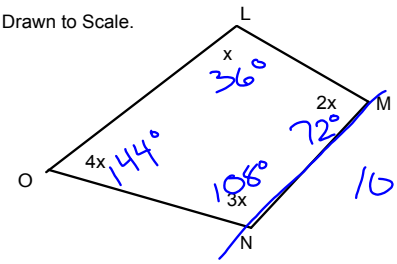
n	15 $*\frac{360}{24}$
interior angle sum	2340°
exterior angle sum	360°
Regular each interior angle	156°
each exterior angle	$180-156 = 24^\circ$ * Find each ext. 1st

n	30
interior angle sum	5040°
exterior angle sum	360°
Regular each interior angle	168°
each exterior angle	12°

n	27
interior angle sum	4500°
exterior angle sum	360°
Regular each interior angle	$166\frac{2}{3}^\circ$ $360 \div 13\frac{1}{3}$ $360 \div \frac{40}{3}$ $360 \times \frac{3}{40}$
each exterior angle	$13\frac{1}{3}^\circ$

	DO: #1	#2
n	12	24
interior angle sum	1800°	3960°
exterior angle sum	360	360
Regular each interior angle	150°	165°
each exterior angle	30°	15°

Not Drawn to Scale.



$10x = 360$
$x = 36$

Which sides are parallel?

$\overline{ON} \parallel \overline{LM}$

HW
p407-408
13, 15, 17, 21-23, 27-29, 31, 32, 34, 37-40

Find the sum of the measures of the interior angles of each convex polygon.

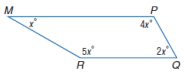
13. 32-gon
15. 19-gon
17. 4y-gon

The measure of an interior angle of a regular polygon is given. Find the number of sides in each polygon.

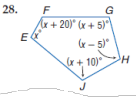
21. 140
22. 170
23. 160

ALGEBRA Find the measure of each interior angle using the given information.

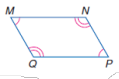
27.



28.



29. parallelogram $MNPQ$ with $m\angle M = 10x$ and $m\angle N = 20x$



31. decagon in which the measures of the interior angles are $x + 5$, $x + 10$, $x + 20$, $x + 30$, $x + 35$, $x + 40$, $x + 60$, $x + 70$, $x + 80$, and $x + 90$

32. polygon $ABCDE$ with $m\angle A = 6x$, $m\angle B = 4x + 13$, $m\angle C = x + 9$, $m\angle D = 2x - 8$, and $m\angle E = 4x - 1$

34. quadrilateral in which the measure of each consecutive angle increases by 10

Find the measures of each exterior angle and each interior angle for each regular polygon.

37. nonagon

38. octagon

Find the measures of an interior angle and an exterior angle given the number of sides of each regular polygon. Round to the nearest tenth if necessary.

39. 11

40. 7